PATENT ABSTRACTS OF JAPAN

(11)Publication number : 11-018057
(43)Date of publication of application : 22.01.1999

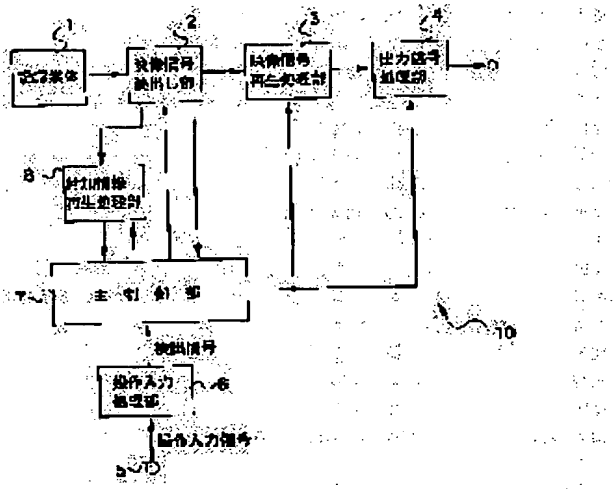
(51)Int.Cl. H04N 5/93
H04N 5/85

(21)Application number : 09-170742
(22)Date of filing : 26.06.1997

(71)Applicant : SONY CORP
(72)Inventor : ARAI NAOHISA
TOMITA MASAMI

(54) DEVICE AND METHOD FOR REPRODUCING VIDEO SIGNAL

(57)Abstract:
PROBLEM TO BE SOLVED: To attain improvement of retrievability at the time of high-speed reproduction and the reduction in the sense of fatigue or discomfort and to enable efficient retrieval by controlling the number of times of repetition for outputting the intermittent signal of an intermit signal processing means, together with the reading interval of a video signal reading means corresponding to reproduced additional information.
SOLUTION: An additional information reproducing processing part 8 reproduces the additional information on the contents of a recorded video signal, together with the video signal on a recording medium 1. When reproducing the video signal from the recording medium 1 at a speed higher than the ordinary reproducing speed, a video signal reading part 2 outputs the intermittent signal by intermittently reading this video signal at every prescribed frame interval corresponding to the reproducing speed. A video signal reproducing processing part 3 outputs the outputted intermittent signals for one frame repeatedly for a prescribed number of times. Corresponding to the additional information reproduced by the additional information reproducing processing part 8, a main control part 7 controls the frame reading interval of the video signal reading part 2 and the number of times of repeated intermit signal outputs from the video signal reproducing processing part 3.



LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1] A video-signal regenerative apparatus characterized by providing the following. An additional information playback means to reproduce additional information about the content of the video signal recorded on a record medium with a video signal A video-signal read-out means to read this video signal intermittently for every predetermined frame gap according to reproduction speed, and to output it as an intermittent signal when reproducing the above-mentioned video signal rather than the usual reproduction speed from the above-mentioned record medium at high speed An intermittent signal-processing means to repeat the above-mentioned intermittent signal for one outputted frame the number of predetermined times, and to output it A control means which controls a count of a repeat which outputs a gap of a frame which the above-mentioned video-signal read-out means reads according to additional information reproduced by the above-mentioned additional information playback means, and an intermittent signal of the above-mentioned intermittent signal-processing means
[Claim 2] The above-mentioned additional information playback means is a video-signal regenerative apparatus according to claim 1 characterized by reproducing additional information which shows the amount of motions of an image recorded on the above-mentioned record medium with the above-mentioned video signal.
[Claim 3] The above-mentioned control means is a video-signal regenerative apparatus according to claim 2 characterized by controlling to narrow a gap of a frame which the above-mentioned video-signal read-out means reads, so that the amount of motions of an image shown by additional information reproduced by the above-mentioned additional information playback means becomes large.
[Claim 4] The above-mentioned control means is a video-signal regenerative apparatus according to claim 3 characterized by controlling to lessen a count of a repeat which outputs an intermittent signal of the above-mentioned intermittent signal-processing means, so that the amount of motions of an image shown by additional information reproduced by the above-mentioned additional information playback means becomes large.
[Claim 5] A video-signal regenerative apparatus characterized by providing the following. A video-signal read-out means to read intermittently additional information about the content of the video signal recorded with this video signal and video signal when a video signal was reproduced rather than the usual reproduction speed from a record medium at high speed for every predetermined frame gap according to reproduction speed, and to output it as an intermittent signal An additional information detection means to detect the above-mentioned additional information from an intermittent signal outputted from the above-mentioned video-signal read-out means A storage means to store an intermittent signal outputted from the above-mentioned video-signal read-out means The control means which controls the count which repeats and reads the above-mentioned intermittent signal for one frame from the intermittent signal-processing means which repeats the above-mentioned intermittent signal for one frame the number of predetermined times, and reads it from the above-mentioned storage means, and a gap and the above-mentioned storage means of the frame which reads a new intermittent signal from the above-mentioned storage means with the above-mentioned intermittent signal-processing means according to the detected above-mentioned additional information
[Claim 6] Additional information about the content of the video signal recorded with a video signal is reproduced from a record medium. When reproducing the above-mentioned video signal rather than the usual reproduction speed from the above-mentioned record medium at high speed, read this video signal intermittently for every predetermined frame gap according to reproduction speed and the reproduced above-mentioned additional information, and it outputs as an intermittent signal. A video-signal playback method characterized by outputting repeatedly according to the above-mentioned additional information which had the above-mentioned intermittent signal for one outputted frame reproduced the number of predetermined times.
[Claim 7] A video-signal playback method according to claim 6 characterized by reproducing additional information which shows the amount of motions of an image recorded with the above-mentioned video signal from the above-mentioned record medium.
[Claim 8] A video-signal playback method according to claim 7 characterized by outputting as an intermittent signal which narrowed a frame gap of a video signal by which reading appearance is carried out to the above-mentioned intermittent target, so that the amount of motions of an image shown from additional information by which playback was carried out [above-mentioned] becomes large.
[Claim 9] A video-signal playback method according to claim 8 characterized by lessening a count of a repeat of an intermittent signal for one frame outputted, so that the amount of motions of an image shown from additional information by which playback was carried out [above-mentioned] became large, and outputting it.

[Claim 10] It outputs as an intermittent signal by reading intermittently additional information about the content of the video signal recorded with this video signal and video signal when a video signal was reproduced rather than the usual reproduction speed from a record medium at high speed for every predetermined frame gap according to reproduction speed. The above-mentioned additional information is detected from an intermittent signal by which the output was carried out [above-mentioned] while memorizing an intermittent signal by which the output was carried out [above-mentioned]. A video-signal playback method characterized by reading the above-mentioned intermittent signal for one memorized frame repeatedly according to the above-mentioned additional information the number of predetermined times, and outputting at intervals of the frame according to the above-mentioned additional information.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[The technical field to which invention belongs] This invention relates to a video-signal regenerative apparatus and the video-signal playback method, and relates to the video-signal regenerative apparatus in which the efficient retrieval at the time of high-speed playback is possible in detail, and the video-signal playback method.
[0002]
[Description of the Prior Art] In the video-signal regenerative apparatus which reads an analog or a digital signal from record media, such as the conventional optical disk and a hard disk, and is reproduced as a video signal or a sound signal, when high-speed playback of 2X or about 3X was carried out, for every two frame or three-frame gap, the video signal for one frame was read intermittently, and the intermittent video signal was outputted for every frame.
[0003] Moreover, in such a conventional video-signal regenerative apparatus, when further high-speed playbacks, such as 10X and 20X, were carried out in order to plan quick nature of retrieval, with the video-signal regenerative apparatus which plays the optical disk with which the video signal and the sound signal (only henceforth a video signal) were recorded, the method which reads an intermittent image by the seek operation which moves an optical pickup to radial [of an optical disk] was adopted. If it outputs this for every frame since the video signal for one frame becomes the low thing of functionality mutually before and after carrying out reading appearance intermittently for every fixed frame gap according to the playback scale factor in carrying out such high-speed playback, the image outputted will change rapidly and it will very be hard to search here. So, when the further above high-speed playbacks were performed conventionally, generally the method of carrying out the multiple frame part per-continuum output of the video signal for one frame by which reading appearance was intermittently carried out for every fixed frame gap, and reproducing was used.
[0004]
[Problem(s) to be Solved by the Invention] However, by such conventional playback method, reading appearance of the video signal is carried out from a record medium for every fixed frame gap according to a playback scale factor in the time of 10 above-mentionedX and high-speed playback of 20X level regardless of the content of the playback images, such as size of the variation (the amount of motions) of an image, and existence of a scene change. Therefore, by the conventional playback method, there was a problem that it became difficult for an image with little correlation [before and after] in the place where change of an image is sharp to be continuously reproduced at the time of high-speed playback aiming at retrieval, Hayami, etc., for example, to understand the content.
[0005] In addition, when reproducing a video signal by the method of 30 frames per second, for example, it is known that the maximum of the display number of sheets of a non-correlated image is about five per second. That is, it becomes a maximum in 1 second to indicate every six images without functionality by the repeat mutual [five kinds of]. although this value has individual difference with an average value — general — more than this — information — increasing (for example, every five images which do not have functionality in mutual [six kinds of] being indicated by the repeat.) — or it is tired from seeing, it is known that it becomes impossible to judge the content.
[0006] Moreover, by such conventional playback method, in order for the abrupt change of a playback image to occur continuously in a place with much change of an image and to give stress to human being's vision etc., it was not suitable for the activity of continuous or long duration. For this reason, by such conventional playback method, the playback scale factor at the time of retrieval was restricted, and efficient retrieval was not able to be performed.

[0007] This invention is proposed in order to solve an above-mentioned trouble, it aims at improvement in the retrieval nature at the time of high-speed playback, and relief of a feeling of fatigue, or displeasure, and aims at offering the video-signal regenerative apparatus and the video-signal playback method of performing efficient retrieval.
[0008]
[Means for Solving the Problem] A video-signal regenerative apparatus concerning this invention which attained this object An additional information playback means to reproduce additional information about the content of the video signal recorded on a record medium with a video signal, A video-signal read-out means to read this video signal intermittently for every predetermined frame gap according to reproduction speed, and to output it as an intermittent signal when reproducing a video signal rather than the usual reproduction speed from a record medium at high speed, An intermittent signal-processing means to repeat an intermittent signal for one outputted frame the

number of predetermined times, and to output it, It has a control means which controls a count of a repeat which outputs a gap of a frame which a video-signal read-out means reads according to additional information reproduced by additional information playback means, and an intermittent signal of an intermittent signal-processing means.
[0009] according to the video-signal regenerative apparatus, high-speed regeneration according to the content of the video signal is performed by controlling a count of a repeat which a video-signal read-out means carries out reading appearance according to reproduced additional information, and outputs an intermittent signal of a gap and an intermittent signal-processing means.
[0010] Moreover, a video-signal playback method concerning this invention which attained this object Additional information about the content of the video signal recorded with a video signal is reproduced from a record medium. When reproducing a video signal rather than the usual reproduction speed from a record medium at high speed, read this video signal intermittently for every predetermined frame gap according to reproduction speed and reproduced additional information, and it outputs as an intermittent signal. According to additional information which had the above-mentioned intermittent signal for one outputted frame reproduced, it outputs repeatedly the number of predetermined times.
[0011] According to a video-signal playback method, an image by which reading appearance was carried out from a record medium at the time of high-speed playback by a count of a repeat which outputs a gap and an intermittent signal of a frame which reads a video signal according to reproduced additional information being determined is displayed fixed time amount every, respectively.
[0012] Furthermore, a video-signal regenerative apparatus concerning this invention which attained this object A video-signal read-out means to read intermittently additional information about the content of the video signal recorded with this video signal and video signal when a video signal was reproduced rather than the usual reproduction speed from a record medium at high speed for every predetermined frame gap according to reproduction speed, and to output it as an intermittent signal, An additional information detection means to detect additional information from an intermittent signal outputted from a video-signal read-out means, A storage means to store an intermittent signal outputted from a video-signal read-out means, An intermittent signal-processing means which repeats the above-mentioned intermittent signal for one frame the number of predetermined times, and reads it from a storage means, It has a control means which controls a count which repeats and reads an intermittent signal for one frame from a gap and a storage means of a frame which reads a new intermittent signal from a storage means with an intermittent signal-processing means according to detected additional information.
[0013] According to the video-signal regenerative apparatus, the high-speed regeneration according to the content of the video signal is performed by controlling a count which repeats and reads the above-mentioned intermittent signal for one frame from a frame gap which a video-signal read-out means reads from a record medium intermittently, a gap of a frame to which an intermittent signal-processing means reads a new intermittent signal from a storage means, and the above-mentioned storage means according to additional information detected from an intermittent signal.
[0014] A video-signal playback method which starts this invention which attained this object further again It outputs as an intermittent signal by reading intermittently additional information about the content of the video signal recorded with this video signal and video signal when a video signal was reproduced rather than the usual reproduction speed from a record medium at high speed for every predetermined frame gap according to reproduction speed. Additional information is detected, an intermittent signal for one memorized frame is repeatedly read from an intermittent signal outputted while memorizing an outputted intermittent signal according to additional information the number of predetermined times, and it outputs at intervals of the frame according to additional information.
[0015] According to a video-signal playback method, an image by which reading appearance was carried out from a record medium at the time of high-speed playback by a count of a repeat which outputs a gap and an intermittent signal of a frame which reads a video signal according to detected additional information being determined is displayed fixed time amount every, respectively.
[0016]
[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained to details with reference to a drawing. The video-signal regenerative apparatus 10 is equipped with the video-signal read-out section 2, the video-signal regeneration section 3, the output signal processing section 4, the actuation input-process section 6, the main control section 7, and the additional information regeneration section 8 in drawing 1 which shows the gestalt of operation of the 1st of this invention. In addition, this video-signal regenerative apparatus 10 operates based on the actuation input from a remote controller 5.
[0017] The video-signal read-out section 2 reads a video signal and additional information from a record medium 1 based on the control signal from the main control section 7. This video-signal read-out section 2 is constituted by the optical pickup etc., after it performs binary-ized processing, error correction processing, etc. about the video signal and additional information which were read from the record medium 1, supplies this video signal to the video-signal regeneration section 3, and supplies additional information to the additional information regeneration section 8, respectively. Moreover, the video-signal read-out section 2 detects a synchronizing signal from a video signal, and supplies this synchronizing signal to the main control section 7.
[0018] In addition, the video-signal read-out section 2 reads a video signal from a record medium 1 at intervals of the frame according to the playback scale factor chosen by the remote controller 5. Namely, in the video-signal regenerative apparatus 10, when performing high-speed playback, in order to thin out an image and to usually

reproduce from the video signal at the time of playback, the video-signal read-out section 2 reads the video signal for one frame from a record medium 1 intermittently at the time of this high-speed playback.
[0019] Record media 1 are an optical disk, a magneto-optic disk, etc. The additional information which shows a video signal and the content of this video signal is recorded on this record medium 1.
[0020] Here, in case additional information records a video signal on a record medium 1 as data other than the image of a record medium 1, it is the information recorded additionally beforehand. With the gestalt of this operation, image characteristic quantity and identification information are recorded as additional information. Among these, image characteristic quantity means the amount of motions obtained by motion detection, the scene change information acquired by scene change inspection appearance. On the other hand, identification information means the information on which video signals inserted in vertical-retrace-line periods other than image data etc. among video signals, such as information and a pilot signal, are overlapped, and, specifically, means the information about the content of the program, a genre, the existence of alphabetic information, musical existence, etc. In addition, identification information is recorded on the head portion (if it is an optical disk and a magneto-optic disk TOC portion) of a record medium 1. Moreover, as identification information, a highlights portion etc. may be classified into the hierarchy under the above-mentioned genre information, for example, and the classification information may be recorded.
[0021] The video-signal regeneration section 3 performs processing which reproduces the video signal by which reading appearance was carried out in the video-signal read-out section 2. This video-signal regeneration section 3 performs that extension processing, when analog-to-digital-conversion processing is carried out and picture compression processing of MPEG etc. is performed for example, if required. Furthermore, the video-signal regeneration section 3 outputs repeatedly the video signal for one frame supplied intermittently based on the control signal from the main control section 7 the number of predetermined times from the video-signal read-out section 2 at the time of high-speed regeneration. The video-signal regeneration section 3 supplies the video signal which performed such regeneration to the output signal processing section 4.
[0022] The output signal processing section 4 performs amplification processing etc., in order to enable it to reproduce with a monitor the video signal supplied from the video-signal regeneration section 3. With the video-signal regenerative apparatus 10, a video signal can be seen now by various playback modes by supplying the output from this output signal processing section 4 to a monitor etc. In addition, from the output signal processing section 4, the video signal for 30 per second is outputted.
[0023] A remote controller 5 gives various instructions of operation to the video-signal regenerative apparatus 10, and outputs the instruction of ON/OFF of the power supply of the video-signal regenerative-apparatus 10 whole, playback/halt of a video signal, the high-speed playback / slow playback / halt at the time of playback of a video signal, setting out/modification of the reproduction speed at the time of high-speed playback, etc., etc. as a control input signal. This control input signal from a remote controller 5 is received in the actuation input-process section 6.

[0024] The actuation input-process section 6 receives the control input signal from a remote controller 5, detects the class of instruction, and supplies the detecting signal to the main control section 7.
[0025] The main control section 7 controls the video-signal read-out section 2, the video-signal regeneration section 3, the output signal processing section 4, and the additional information regeneration section 8 based on the detecting signal from the actuation input-process section 6.
[0026] Moreover, the main control section 7 detects a synchronizing signal from the video-signal regeneration section 3, and generates a clock from this synchronizing signal. The main control section 7 supplies this generated clock to the video-signal read-out section 2, the video-signal regeneration section 3, and output signal processing section 4 grade.
[0027] The additional information regeneration section 8 reproduces the above-mentioned additional information supplied from the video-signal read-out section 2. The additional information reproduced by the additional information regeneration section 8 is used for the control at the time of high-speed playback by being inputted into the main control section 7. In addition, since the motion information showing the amount of motions of above-mentioned image characteristic quantity exists in a bit stream in the case of MPEG, the motion information in P and B-picture following the motion information on a read-out frame or the information on the near, for example, I-picture for random access, is detected. Since this motion information is the unit which divided the screen into the fine block (macro block) and exists, it takes that 1 screen average to which it acquired and that it moves and is the magnitude (a direction can be disregarded) of an amount. Furthermore, the average of this amount of motions is reproduced as additional information by taking a rear-spring-supporter average on several acquisition frames.
[0028] Next, actuation of the main control section 7 in the video-signal regenerative apparatus 10 is explained with reference to the flow chart of drawing 2 . In step S1 behind powering on, the main control section 7 performs the initial setting of the video-signal read-out section 2, the video-signal regeneration section 3, and actuation input-process section 6 grade, i.e., initialization, and progresses to step S2.
[0029] The main control section 7 will be in the state waiting for an actuation input which waits for the control input signal from a remote controller 5 in step S2. When it stands by at step S2 and there is an actuation input until it judges whether the main control section 7 had an actuation input by detecting the existence of the detecting signal from the actuation input-process section 6 and there is an actuation input, specifically, it progresses to step S3. In this step S3, the main control section 7 progresses to step S4, when it judges whether it was specified as high-speed playback by this actuation input and is judged with it not being high-speed playback, and it performs the usual

regeneration about a video signal.
[0030] The main control section 7 progresses to step S5, when judged with it being high-speed playback at step S3, and it performs the following high-speed regeneration.
[0031] In step S5, the main control section 7 is controlled to operate the additional information regeneration section 8 with this video-signal read-out section 2. By this control, the additional information regeneration section 8 reproduces additional information, and supplies this additional information to the main control section 7 in advance of playback of a video signal. In addition, although carried out about a part for all the frame numbers of the video signal recorded on the record medium 1, since it shifts to playback actuation of a video signal early, it may be made to perform playback of additional information only about a part for the frame of a fixed range.
[0032] In the following step S6, the main control section 7 chooses the frame number which reads a video signal from a record medium 1 to per fixed time amount according to the playback scale factor of high-speed playback. With the video-signal regenerative apparatus 10, the gap (henceforth a read-out gap) of the frame which reads the video signal currently recorded on the record medium 1 in the video-signal read-out section 2 will be chosen according to the playback scale factor chosen by the remote controller 5 by this.
[0033] In continuing step S7, the main control section 7 changes this read-out gap suitably according to additional information by making the additional information supplied from the additional information regeneration section 8 reflect in the above-mentioned read-out gap. In the video-signal regenerative apparatus 10, the final frame number of the image outputted at the time of high-speed playback, i.e., the frame number (henceforth a read-out frame number) of the video signal intermittently read to per unit time amount and the frame number (henceforth the number of display frames) which carries out the repeat output of this video signal for one frame by which reading appearance was carried out, is determined by this processing of step S7. In addition, the relation between a read-out frame number and the number of display frames turns into relation of reverse proportion, when a playback scale factor is made to fix.
[0034] And in the following step S8, the main control section 7 is controlled to carry out skip playback of the video-signal read-out section 2 based on the determined read-out frame number, and reads a required video signal from a record medium 1 intermittently. This step S8 is processing which reads a discontinuous image one by one.
[0035] Furthermore, in the following step S9, the main control section 7 controls the video-signal regeneration section 3 so that only the number of the above-mentioned numbers of display frames carries out the repeat output of the image in which reading appearance was carried out by this read-out processing.
[0036] It will be in the condition of going into the mode of operation to which high-speed playback of a video signal is performed, returning to step S2 after that, and standing by the next actuation input with the playback scale factor chosen by the remote controller 5 in the video-signal regenerative apparatus 10 by this the control of a series of.
[0037] Hereafter, the concrete control method is explained to the pan in high-speed regeneration of this video-signal regenerative apparatus 10. The main control section 7 determines the output method of a video signal in the above-mentioned step S6 by choosing the frame number which reads a video signal to per fixed time amount according to a reproductive scale factor.
[0038] Drawing 3 shows the example in the case of performing 10X playback, and explains the case where high-speed playback of the 1200-frame video signal for 40 seconds shown in drawing 3 (A) is hereafter carried out in 120-frame 4 seconds. In addition, about this high-speed playback, for convenience, although only three kinds of patterns are shown in drawing 3 (B) thru/or (G), this invention is not the thing of explanation limited to three kinds of this pattern. Moreover, only in 10X playback, it explains about this high-speed playback, but as for this invention, it is needless to say that lessons is taken from high-speed playback, and it is not limited to these 10X, and can apply also in 10X or less or high-speed playback of 10X or more.
[0039] In this video-signal regenerative apparatus 10, the read-out gap (read-out frame number) of three patterns, A, B, and C, can be chosen now at the time of 10X playback. In the case of A pattern, a read-out gap is every 150 frames, and the read-out frame number around for 40 seconds has become 8. specifically, it is shown in drawing 3 (B) — as — the video signal for 1200 frames to a 150-frame gap — the video signals A1, B1, C1, and D1 for a total of eight frames, and ... H1 is read. And by A pattern, the number of display frames is 15, and as shown in drawing 3 (E), 8x15=120 frame is constituted in 4 seconds by outputting continuously each [these] video signal A1 by which reading appearance was carried out thru/or H1 every 15 times (15 frames), respectively.
[0040] Moreover, in the case of B pattern, a read-out gap is every 300 frames, and the read-out frame number around for 40 seconds has become 4. As shown in drawing 3 (C), specifically, the video signals A1, C1, E1, and G1 for a total of four frames are read from the video signal for 1200 frames at intervals of 300 frames. And by B pattern, the number of display frames is 30, and as shown in drawing 3 (F), 4x30=120 frame is constituted in 4 seconds by outputting continuously each [these] video signals A1, C1, E1, and G1 by which reading appearance was carried out every 30 times (30 frames), respectively.
[0041] Furthermore, in the case of C pattern, a read-out gap is every 600 frames, and the read-out frame number around for 40 seconds has become 2. As shown in drawing 3 (D), specifically, the video signals A1 and E1 for a total of two frames are read from the video signal for 1200 frames at intervals of 600 frames. And by C pattern, the number of display frames is 60, and as shown in drawing 3 (F), 2x60=120 frame is constituted in 4 seconds by outputting continuously each [these] video signals A1 and E1 by which reading appearance was carried out every 60 times (60 frames), respectively.
[0042] In the video-signal regenerative apparatus 10, when reproduction speed is 10X in this way, either of three patterns mentioned above in the above-mentioned step S6 by the main control section 7 is chosen. And the

methods of this selection differ in the fixed mode and adjustable mode which are explained below. In the video-signal regenerative apparatus 10, it is chosen through the actuation input-process section 6 by the control input signal from a remote controller 5 about which shall perform high-speed playback between fixed mode and adjustable mode.

[0043] Here, fixed mode means the mode in which fix to one of patterns and high-speed regeneration is performed. For example, only the above-mentioned A patterns are condition, such as B pattern or C pattern, and are chosen about whether which pattern performs high-speed regeneration by the control input signal from a remote controller 5. Therefore, it is also possible to change the pattern of a display during high-speed playback into arbitration in this fixed mode, when a user operates a remote controller 5.
[0044] In addition, in this fixed mode, in order not to make additional information reflect, processing of the above-mentioned step S5 and step S7 grade becomes unnecessary. But what is necessary is just to determine whether to put high-speed playback into operation with which pattern of Above A and C according to this genre at step S7, when above-mentioned genre information is reproduced by performing control in which additional information was made to reflect also in this fixed mode at step S5 possible. Thereby, in the video-signal regenerative apparatus 10, high-speed playback starts in the optimal setting out according to a genre, and it becomes possible to switch a pattern to arbitration by actuation of a remote controller 5 according to a user's moving state eyesight etc. after that.
[0045] On the other hand, without fixing high-speed regeneration to one of patterns, adjustable mode switches a pattern at any time according to additional information, and means the mode in which it dies (shifting). With the gestalt of this operation, it is supposed that basic setting out at the time of being 10 times the playback scale factor of this is used as B pattern in the above-mentioned step S6, and sequential change of the pattern will be carried out according to additional information at the following step S7. That is, according to the content of additional information, such as the amount of motions, the configuration of a display frame is changed at any time by shifting to A pattern from B pattern at step S7, for example, when the amount of motions is large, moving to reverse, and shifting to C pattern, when an amount is small.
[0046] Hereafter, an example is given and explained about the control method of the main control section 7 in this adjustable mode. When the additional information supplied from the additional information regeneration section 8 is the amount of motions of the above-mentioned image characteristic quantity, in order that an image with many motions may more generally grasp the content, it will be necessary to make [many] a read-out frame number. Therefore, the main control section 7 is controlled to shift to C pattern that it shifts to A pattern that a read-out frame number should be made [many] in the above-mentioned step S7 when the value of the amount of motions is large, and a read-out frame number should be made few when the value of the amount of motions is small on the other hand.
[0047] Therefore, in this adjustable mode, the ease of retrieval is realizable by mainly being reproduced by A pattern, for example about an image like a sports program with many motions, and reproducing an image with comparatively high functionality continuously. The feeling of fatigue at the time of retrieval decreases by mainly being reproduced by C pattern about an image like a weather report without an almost [on the other hand] motion, and the same image's covering 60 frames (for 2 seconds), and reproducing it.
[0048] Moreover, when the additional information supplied from the additional information regeneration section 8 is the scene change information of the above-mentioned image characteristic quantity, in order that an image with many scene changes may more generally grasp the content, it will be necessary to make [many] a read-out frame number. Therefore, the main control section 7 is controlled to shift to A pattern that a read-out frame number should be made [many] in the above-mentioned step S7, when scene change information is supplied.
[0049] Therefore, in adjustable mode, the ease of retrieval is attained by mainly being reproduced by A pattern, for example about an image like an action film with many scene changes, and reproducing the image before and after a scene change. On the other hand, for example about an image like a love film with few scene changes, it will mainly be reproduced by C pattern, and the feeling of fatigue at the time of retrieval decreases like ****.
[0050] Furthermore, when the additional information supplied from the additional information regeneration section 8 is identification information, such as the content of the above-mentioned program, a genre, existence of alphabetic information, and musical existence, the main control section 7 controls a read-out frame as follows by referring to those information.
[0051] For example, generally a news program has few motions as compared with an above-mentioned sports program etc., and there are many scenes in which alphabetic information is inserted. Therefore, when the identification information of the purport whose content of a program is a news program is inputted into the main control section 7 through the additional information regeneration section 8, it controls by the video-signal regenerative apparatus 10 to begin high-speed playback by C pattern that this main control section 7 should make the number of read-out frames few in the above-mentioned step S7. While the feeling of fatigue at the time of retrieval decreases by this by the same image's covering 60 frames (for 2 seconds), and reproducing it in high-speed playback of a news program, since a static image continues for 2 seconds, effects, like it becomes possible to read alphabetic information clearly arise.
[0052] Furthermore, in this adjustable mode, the main control section 7 controls by making this identification information reflect in the amount of motions of the above-mentioned image characteristic quantity etc. For example, even if it is the same amount of motions, the motion scene of a sports program has that it is [much] more important than the motion scene of a news program, for example. Therefore, the main control section 7 is controlled

to make [many] relatively the read-out frame number to the amount of motions, when the identification information which shows that a video signal is a sports program is inputted.
[0053] In the adjustable mode explained above, it differs in the number of display frames mutually by A pattern, B pattern, and C pattern, and the playback scale factor is set constant by making a product with a read-out frame number equal to mutual.
[0054] On the other hand, it has come to be also able to perform changing and displaying a playback scale factor according to the content of additional information at the time of high-speed playback (henceforth adjustable scale-factor mode) further in this video-signal regenerative apparatus 10. In this adjustable scale-factor mode, it becomes possible by setting up that minimum value, making a read-out gap adjustable, and setting the number of display frames as the fixed value by one side to gather a playback scale factor about the range of a video signal for example, with the small amount of motions, and to aim at compaction of the retrieval time as the whole. In this case, the minimum scale factor at the time of high-speed playback will be determined by defining the minimum value of a read-out gap.
[0055] This adjustable scale-factor mode is easily realizable by modification of only setting up equally to mutual the number of display frames of A pattern, B pattern, and C pattern from the condition in for example, the above-mentioned adjustable mode.
[0056] Hereafter, with reference to drawing 4 , it explains per example of setting out in this adjustable scale-factor mode. In addition, in this example, the number of display frames is set as the 15 [same] as the above-mentioned A pattern, and the minimum value of a read-out gap is set to the 150 [same] as the above-mentioned A pattern so that the minimum scale factor at the time of high-speed playback may become 10X.
[0057] In addition, as shown in drawing 4 (A), the case where high-speed playback of the video signal for 2400 frame (80 seconds) is carried out in adjustable scale-factor mode is explained here. Moreover, in order to make an understanding easy, to drawing 4 (B) and (D), a case with a fixed playback scale factor [by A pattern shown in drawing 3 (B) and (E), respectively] of 10X is re-**(ed), and an example at the time of carrying out high-speed playback in adjustable scale-factor mode is shown in drawing 4 (C) and (E).
[0058] Although the control method of the main control section 7 when the additional information supplied from the additional information regeneration section 8 is the amount of motions of the above-mentioned image characteristic quantity is explained hereafter, when the supplied additional information is the scene change information of the image characteristic quantity, and it is identification information, such as the content of the program, a genre, existence of alphabetic information, and musical existence, the same control can realize.
[0059] In this adjustable scale-factor mode, when the additional information which shows that the amount of motions is large is inputted as shown in the drawing 4 (C) left-hand side for example, it will be in the condition of A pattern shown in drawing 3 (B), and reading appearance of the video signals A1, B1, C1, D1, and E1 is carried out by the video-signal read-out section 2 at intervals of 150 frames like the case of 10X immobilization of drawing 4 (B). And in this condition, playback will be made by 10X which is the minimum scale factor as shown in drawing 4 (E).
[0060] Moreover, in adjustable scale-factor mode, when the additional information which shows that the amount of motions is whenever [middle] is detected so that it may be shown in the center of abbreviation of drawing 4 (C), read-out of a video signal will be in the condition of B pattern shown in drawing 3 (C), at intervals of 300 frames, reading appearance of the video signals G1, F1, and I1 is carried out, and reading appearance of the video signals F1 and H1 is not carried out. Consequently, since playback number of sheets (frame number) is set as 15 sheets, about the image outputted, it becomes 20X so that it may be shown in the center of abbreviation of drawing 4 (E).
[0061] Furthermore, in adjustable scale-factor mode, as shown in the drawing 4 (C) right-hand side, when the additional information which shows that the amount of motions is small is detected, read-out of a video signal will be in the condition of C pattern shown in drawing 3 (D), at intervals of 600 frames, reading appearance of the video signal M1 is carried out, and reading appearance of the video signals J1, K1, and L1 is not carried out. Therefore, in this case, as shown in the drawing 4 (E) right-hand side, about the image outputted, it becomes 30X.
[0062] If the above processing is summarized, it will mean that the playback time amount which took 8 seconds in 10X immobilization was shortened as a result at 4 seconds, and will end by the same retrieval time as the case where it reproduces by 20X. And since the gap read about a portion with the large amount of motions of a video signal in this case is narrowed and the gap which moves to reverse and is read about a portion with a small amount is made large, the high image of functionality will be reproduced mutually. therefore, in comparison with the case of 20 simpleX which set constant the gap which reads a video signal, the ease of retrieval is markedly alike and improves.
[0063] The gestalt of operation of the 2nd of this invention is shown in drawing 5 . In the gestalt of operation of the 2nd of this invention, video-signal regenerative-apparatus 10A is equipped with the video-signal read-out section 2, the intermittent signal-processing section 11, memory 12, the output signal processing section 4, the actuation input-process section 6, main control section 7A, the additional information regeneration section 8, and the additional information detection processing section 13.
[0064] This video-signal regenerative-apparatus 10A operates like the video-signal regenerative apparatus 10 mentioned above based on the actuation input from a remote controller 5. In addition, about the portion which attached the same sign as the video-signal regenerative apparatus 10 mentioned above, a configuration is the same as the video-signal regenerative apparatus 10, and the detailed explanation is omitted.
[0065] In case this video-signal regenerative-apparatus 10A is equipped with the same function as the video-signal regenerative apparatus 10 and carries out intermittent read-out of the video signal from a record medium 1 by the

video-signal read-out section 2 at the time of high-speed playback, it enables it to output a video signal more nearly promptly by detecting additional information by the additional information detection processing section 13. That is, the additional information detection processing section 13 detects the above-mentioned additional information supplied at the time of intermittent read-out of the video signal by the video-signal read-out section 2. The additional information detected by the additional information detection processing section 13 is used for the control at the time of high-speed playback by being inputted into main control section 7A.

[0066] The intermittent signal-processing section 11 performs processing which reproduces the video signal by which reading appearance was carried out in the video-signal read-out section 2 like the video-signal regeneration section 3 in the above-mentioned video-signal regenerative apparatus 10. And if required, when analog-to-digital-conversion processing is carried out and picture compression processing of MPEG etc. is performed, the extension processing is performed. The intermittent signal-processing section 11 supplies the video signal which performed such regeneration to the output signal processing section 4 as it is at the time of the usual playback.

[0067] On the other hand, the intermittent signal-processing section 11 is beginning to read the video signal which once wrote the video signal which performed such regeneration in memory 12 at the time of high-speed playback, and was written in this memory 12 based on the control from main control section 7A by one frame, and supplies it to the output signal processing section 4 repeatedly the number of predetermined times.

[0068] That is, in this video-signal regenerative-apparatus 10A, the additional information detection processing section 13 detects the additional information included in the video signal intermittently reproduced by the video-signal read-out section 2 at the time of high-speed playback, and image characteristic quantity, such as the detected amount of motions, is supplied to main control section 7A. And in case the intermittent signal-processing section 11 reads the video signal written in memory 12 based on the control signal from main control section 7A, it performs infanticide processing in which the image characteristic quantity was made to reflect.

[0069] The control in this case reproduces the refreshable maximum frame number (namely, the minimum gap) for a certain scale factor, thins it out according to image characteristic quantity, and is made to carry out adjustable [of the amount]. In this video-signal regenerative-apparatus 10A, the video signal is always read from the record medium 1 with A pattern mentioned above by drawing 3 (B) by the video-signal read-out section 2, and the video signal by which intermittent playback was carried out in the intermittent signal-processing section 11 is written in memory 12. And the intermittent signal-processing section 11 carries out infanticide processing so that it may usually become B pattern, and it should just switch it to A pattern or C pattern according to the additional information detected by the additional information detection processing section 13.

[0070]

[Effect of the Invention] As explained to details above, according to the video-signal regenerative apparatus concerning this invention by controlling the count of the repeat which a video-signal read-out means carries out reading appearance according to the additional information reproduced or detected, and outputs the intermittent signal of a gap and an intermittent signal-processing means Each image by which reading appearance was carried out at intervals of predetermined with the video-signal read-out means at the time of high-speed playback is displayed fixed time amount every, respectively, and high-speed regeneration according to the content of the video signal is performed.

[0071] Therefore, while according to the video-signal regenerative apparatus a retrieval person's stress produced from an image with little functionality being reproduced quickly one after another is eased and relief of the improvement in retrieval nature and the feeling of fatigue at the time of retrieval, and displeasure is achieved, it becomes possible to attain high scale-factor-ization with the still much more high-speed playback.

[0072] Moreover, according to the video-signal playback method concerning this invention, the image by which reading appearance was carried out at intervals of predetermined from the record medium at the time of high-speed playback by controlling the count of the repeat which outputs the frame gap which reads a video signal according to the additional information reproduced or detected, and an intermittent signal is displayed fixed time amount every, respectively, and high-speed regeneration according to the content of the video signal is performed.

[0073] Therefore, according to the video-signal playback method, a retrieval person's stress produced from an image with little functionality being reproduced quickly one after another is eased, and relief of the improvement in retrieval nature and the feeling of fatigue at the time of retrieval, and displeasure can be aimed at.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

TECHNICAL FIELD

[The technical field to which invention belongs] This invention relates to a video-signal regenerative apparatus and the video-signal playback method, and relates to the video-signal regenerative apparatus in which the efficient retrieval at the time of high-speed playback is possible in detail, and the video-signal playback method.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

PRIOR ART

[Description of the Prior Art] In the video-signal regenerative apparatus which reads an analog or a digital signal from record media, such as the conventional optical disk and a hard disk, and is reproduced as a video signal or a sound signal, when high-speed playback of 2X or about 3X was carried out, for every two frame or three-frame gap, the video signal for one frame was read intermittently, and the intermittent video signal was outputted for every frame.
[0003] Moreover, in such a conventional video-signal regenerative apparatus, when further high-speed playbacks, such as 10X and 20X, were carried out in order to plan quick nature of retrieval, with the video-signal regenerative apparatus which plays the optical disk with which the video signal and the sound signal (only henceforth a video signal) were recorded, the method which reads an intermittent image by the seek operation which moves an optical pickup to radial [of an optical disk] was adopted. If it outputs this for every frame since the video signal for one frame becomes the low thing of functionality mutually before and after carrying out reading appearance intermittently for every fixed frame gap according to the playback scale factor in carrying out such high-speed playback, the image outputted will change rapidly and it will very be hard to search here. So, when the further above high-speed playbacks were performed conventionally, generally the method of carrying out the multiple frame part per-continuum output of the video signal for one frame by which reading appearance was intermittently carried out for every fixed frame gap, and reproducing was used.

[Translation done.]

* NOTICES *

EFFECT OF THE INVENTION

[Effect of the Invention] According to the video-signal regenerative apparatus applied to this invention as explained to details above Each image by which reading appearance was carried out at intervals of predetermined with the video-signal read-out means at the time of high-speed playback by controlling the count of the repeat which outputs the intermittent signal of the read-out gap of a video-signal read-out means and an intermittent signal-processing means according to the additional information reproduced or detected is displayed fixed time amount every, respectively, and high-speed regeneration according to the content of the video signal is performed.
[0071] Therefore, while according to the video-signal regenerative apparatus a retrieval person's stress produced from an image with little functionality being reproduced quickly one after another is eased and relief of the improvement in retrieval nature and the feeling of fatigue at the time of retrieval, and displeasure is achieved, it becomes possible to attain high scale-factor-ization with the still much more high-speed playback.
[0072] Moreover, according to the video-signal playback method concerning this invention, the image by which reading appearance was carried out at intervals of predetermined from the record medium at the time of high-speed playback by controlling the count of the repeat which outputs the frame gap which reads a video signal according to the additional information reproduced or detected, and an intermittent signal is displayed fixed time amount every, respectively, and high-speed regeneration according to the content of the video signal is performed.
[0073] Therefore, according to the video-signal playback method, a retrieval person's stress produced from an image with little functionality being reproduced quickly one after another is eased, and relief of the improvement in retrieval nature and the feeling of fatigue at the time of retrieval, and displeasure can be aimed at.

[Translation done.]

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, by such conventional playback method, reading appearance of the video signal is carried out from a record medium for every fixed frame gap according to a playback scale factor in the time of 10 above-mentionedX and high-speed playback of 20X level regardless of the content of the playback images, such as size of the variation (the amount of motions) of an image, and existence of a scene change. Therefore, by the conventional playback method, there was a problem that it became difficult for an image with little correlation [before and after] in the place where change of an image is sharp to be continuously reproduced at the time of high-speed playback aiming at retrieval, Hayami, etc., for example, to understand the content.
[0005] In addition, when reproducing a video signal by the method of 30 frames per second, for example, it is known that the maximum of the display number of sheets of a non-correlated image is about five per second. That is, it becomes a maximum in 1 second to indicate every six images without functionality by the repeat mutual [five kinds of]. although this value has individual difference with an average value — general — more than this — information — increasing (for example, every five images which do not have functionality in mutual [six kinds of] being indicated by the repeat.) — or it is tired from seeing, it is known that it becomes impossible to judge the content.
[0006] Moreover, by such conventional playback method, in order for the abrupt change of a playback image to occur continuously in a place with much change of an image and to give stress to human being's vision etc., it was not suitable for the activity of continuous or long duration. For this reason, by such conventional playback method, the playback scale factor at the time of retrieval was restricted, and efficient retrieval was not able to be performed.

[0007] This invention is proposed in order to solve an above-mentioned trouble, it aims at improvement in the retrieval nature at the time of high-speed playback, and relief of a feeling of fatigue, or displeasure, and aims at offering the video-signal regenerative apparatus and the video-signal playback method of performing efficient retrieval.

[Translation done.]

MEANS

[Means for Solving the Problem] A video-signal regenerative apparatus concerning this invention which attained this object An additional information playback means to reproduce additional information about the content of the video signal recorded on a record medium with a video signal, A video-signal read-out means to read this video signal intermittently for every predetermined frame gap according to reproduction speed, and to output it as an intermittent signal when reproducing a video signal rather than the usual reproduction speed from a record medium at high speed, An intermittent signal-processing means to repeat an intermittent signal for one outputted frame the number of predetermined times, and to output it, It has a control means which controls a count of a repeat which outputs a gap of a frame which a video-signal read-out means reads according to additional information reproduced by additional information playback means, and an intermittent signal of an intermittent signal-processing means.
[0009] according to the video-signal regenerative apparatus, high-speed regeneration according to the content of the video signal is performed by controlling a count of a repeat which a video-signal read-out means carries out reading appearance according to reproduced additional information, and outputs an intermittent signal of a gap and an intermittent signal-processing means.
[0010] Moreover, a video-signal playback method concerning this invention which attained this object Additional information about the content of the video signal recorded with a video signal is reproduced from a record medium. When reproducing a video signal rather than the usual reproduction speed from a record medium at high speed, read this video signal intermittently for every predetermined frame gap according to reproduction speed and reproduced additional information, and it outputs as an intermittent signal. According to additional information which had the above-mentioned intermittent signal for one outputted frame reproduced, it outputs repeatedly the number of predetermined times.
[0011] According to a video-signal playback method, an image by which reading appearance was carried out from a record medium at the time of high-speed playback by a count of a repeat which outputs a gap and an intermittent signal of a frame which reads a video signal according to reproduced additional information being determined is displayed fixed time amount every, respectively.
[0012] Furthermore, a video-signal regenerative apparatus concerning this invention which attained this object A video-signal read-out means to read intermittently additional information about the content of the video signal recorded with this video signal and video signal when a video signal was reproduced rather than the usual reproduction speed from a record medium at high speed for every predetermined frame gap according to reproduction speed, and to output it as an intermittent signal, An additional information detection means to detect additional information from an intermittent signal outputted from a video-signal read-out means, A storage means to store an intermittent signal outputted from a video-signal read-out means, An intermittent signal-processing means which repeats the above-mentioned intermittent signal for one frame the number of predetermined times, and reads it from a storage means, It has a control means which controls a count which repeats and reads an intermittent signal for one frame from a gap and a storage means of a frame which reads a new intermittent signal from a storage means with an intermittent signal-processing means according to detected additional information.
[0013] According to the video-signal regenerative apparatus, the high-speed regeneration according to the content of the video signal is performed by controlling a count which repeats and reads the above-mentioned intermittent signal for one frame from a frame gap which a video-signal read-out means reads from a record medium intermittently, a gap of a frame to which an intermittent signal-processing means reads a new intermittent signal from a storage means, and the above-mentioned storage means according to additional information detected from an intermittent signal.
[0014] A video-signal playback method which starts this invention which attained this object further again It outputs as an intermittent signal by reading intermittently additional information about the content of the video signal recorded with this video signal and video signal when a video signal was reproduced rather than the usual reproduction speed from a record medium at high speed for every predetermined frame gap according to reproduction speed. Additional information is detected, an intermittent signal for one memorized frame is repeatedly read from an intermittent signal outputted while memorizing an outputted intermittent signal according to additional information the number of predetermined times, and it outputs at intervals of the frame according to additional information.
[0015] According to a video-signal playback method, an image by which reading appearance was carried out from a record medium at the time of high-speed playback by a count of a repeat which outputs a gap and an intermittent signal of a frame which reads a video signal according to detected additional information being determined is

displayed fixed time amount every, respectively.
[0016]
[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained to details with reference to a drawing. The video-signal regenerative apparatus 10 is equipped with the video-signal read-out section 2, the video-signal regeneration section 3, the output signal processing section 4, the actuation input-process section 6, the main control section 7, and the additional information regeneration section 8 in drawing 1 which shows the gestalt of operation of the 1st of this invention. In addition, this video-signal regenerative apparatus 10 operates based on the actuation input from a remote controller 5.
[0017] The video-signal read-out section 2 reads a video signal and additional information from a record medium 1 based on the control signal from the main control section 7. This video-signal read-out section 2 is constituted by the optical pickup etc., after it performs binary-ized processing, error correction processing, etc. about the video signal and additional information which were read from the record medium 1, supplies this video signal to the video-signal regeneration section 3, and supplies additional information to the additional information regeneration section 8, respectively. Moreover, the video-signal read-out section 2 detects a synchronizing signal from a video signal, and supplies this synchronizing signal to the main control section 7.
[0018] In addition, the video-signal read-out section 2 reads a video signal from a record medium 1 at intervals of the frame according to the playback scale factor chosen by the remote controller 5. Namely, in the video-signal regenerative apparatus 10, when performing high-speed playback, in order to thin out an image and to usually reproduce from the video signal at the time of playback, the video-signal read-out section 2 reads the video signal for one frame from a record medium 1 intermittently at the time of this high-speed playback.
[0019] Record media 1 are an optical disk, a magneto-optic disk, etc. The additional information which shows a video signal and the content of this video signal is recorded on this record medium 1.
[0020] Here, in case additional information records a video signal on a record medium 1 as data other than the image of a record medium 1, it is the information recorded additionally beforehand. With the gestalt of this operation, image characteristic quantity and identification information are recorded as additional information. Among these, image characteristic quantity means the amount of motions obtained by motion detection, the scene change information acquired by scene change inspection appearance. On the other hand, identification information means the information on which video signals inserted in vertical-retrace-line periods other than image data etc. among video signals, such as information and a pilot signal, are overlapped, and, specifically, means the information about the content of the program, a genre, the existence of alphabetic information, musical existence, etc. In addition, identification information is recorded on the head portion (if it is an optical disk and a magneto-optic disk TOC portion) of a record medium 1. Moreover, as identification information, a highlights portion etc. may be classified into the hierarchy under the above-mentioned genre information, for example, and the classification information may be recorded.
[0021] The video-signal regeneration section 3 performs processing which reproduces the video signal by which reading appearance was carried out in the video-signal read-out section 2. This video-signal regeneration section 3 performs that extension processing, when analog-to-digital-conversion processing is carried out and picture compression processing of MPEG etc. is performed for example, if required. Furthermore, the video-signal regeneration section 3 outputs repeatedly the video signal for one frame supplied intermittently based on the control signal from the main control section 7 the number of predetermined times from the video-signal read-out section 2 at the time of high-speed regeneration. The video-signal regeneration section 3 supplies the video signal which performed such regeneration to the output signal processing section 4.
[0022] The output signal processing section 4 performs amplification processing etc., in order to enable it to reproduce with a monitor the video signal supplied from the video-signal regeneration section 3. With the video-signal regenerative apparatus 10, a video signal can be seen now by various playback modes by supplying the output from this output signal processing section 4 to a monitor etc. In addition, from the output signal processing section 4, the video signal for 30 per second is outputted.
[0023] A remote controller 5 gives various instructions of operation to the video-signal regenerative apparatus 10, and outputs the instruction of ON/OFF of the power supply of the video-signal regenerative-apparatus 10 whole, playback/halt of a video signal, the high-speed playback / slow playback / halt at the time of playback of a video signal, setting out/modification of the reproduction speed at the time of high-speed playback, etc., etc. as a control input signal. This control input signal from a remote controller 5 is received in the actuation input-process section 6.

[0024] The actuation input-process section 6 receives the control input signal from a remote controller 5, detects the class of instruction, and supplies the detecting signal to the main control section 7.
[0025] The main control section 7 controls the video-signal read-out section 2, the video-signal regeneration section 3, the output signal processing section 4, and the additional information regeneration section 8 based on the detecting signal from the actuation input-process section 6.
[0026] Moreover, the main control section 7 detects a synchronizing signal from the video-signal regeneration section 3, and generates a clock from this synchronizing signal. The main control section 7 supplies this generated clock to the video-signal read-out section 2, the video-signal regeneration section 3, and output signal processing section 4 grade.
[0027] The additional information regeneration section 8 reproduces the above-mentioned additional information supplied from the video-signal read-out section 2. The additional information reproduced by the additional

information regeneration section 8 is used for the control at the time of high-speed playback by being inputted into the main control section 7. In addition, since the motion information showing the amount of motions of above-mentioned image characteristic quantity exists in a bit stream in the case of MPEG, the motion information in P and B-picture following the motion information on a read-out frame or the information on the near, for example, I-picture for random access, is detected. Since this motion information is the unit which divided the screen into the fine block (macro block) and exists, it takes that 1 screen average to which it acquired and that it moves and is the magnitude (a direction can be disregarded) of an amount. Furthermore, the average of this amount of motions is reproduced as additional information by taking a rear-spring-supporter average on several acquisition frames.

[0028] Next, actuation of the main control section 7 in the video-signal regenerative apparatus 10 is explained with reference to the flow chart of drawing 2 . In step S1 behind powering on, the main control section 7 performs the initial setting of the video-signal read-out section 2, the video-signal regeneration section 3, and actuation input-process section 6 grade, i.e., initialization, and progresses to step S2.

[0029] The main control section 7 will be in the state waiting for an actuation input which waits for the control input signal from a remote controller 5 in step S2. When it stands by at step S2 and there is an actuation input until it judges whether the main control section 7 had an actuation input by detecting the existence of the detecting signal from the actuation input-process section 6 and there is an actuation input, specifically, it progresses to step S3. In this step S3, the main control section 7 progresses to step S4, when it judges whether it was specified as high-speed playback by this actuation input and is judged with it not being high-speed playback, and it performs the usual regeneration about a video signal.

[0030] The main control section 7 progresses to step S5, when judged with it being high-speed playback at step S3, and it performs the following high-speed regeneration.

[0031] In step S5, the main control section 7 is controlled to operate the additional information regeneration section 8 with this video-signal read-out section 2. By this control, the additional information regeneration section 8 reproduces additional information, and supplies this additional information to the main control section 7 in advance of playback of a video signal. In addition, although carried out about a part for all the frame numbers of the video signal recorded on the record medium 1, since it shifts to playback actuation of a video signal early, it may be made to perform playback of additional information only about a part for the frame of a fixed range.

[0032] In the following step S6, the main control section 7 chooses the frame number which reads a video signal from a record medium 1 to per fixed time amount according to the playback scale factor of high-speed playback. With the video-signal regenerative apparatus 10, the gap (henceforth a read-out gap) of the frame which reads the video signal currently recorded on the record medium 1 in the video-signal read-out section 2 will be chosen according to the playback scale factor chosen by the remote controller 5 by this.

[0033] In continuing step S7, the main control section 7 changes this read-out gap suitably according to additional information by making the additional information supplied from the additional information regeneration section 8 reflect in the above-mentioned read-out gap. In the video-signal regenerative apparatus 10, the final frame number of the image outputted at the time of high-speed playback, i.e., the frame number (henceforth a read-out frame number) of the video signal intermittently read to per unit time amount and the frame number (henceforth the number of display frames) which carries out the repeat output of this video signal for one frame by which reading appearance was carried out, is determined by this processing of step S7. In addition, the relation between a read-out frame number and the number of display frames turns into relation of reverse proportion, when a playback scale factor is made to fix.

[0034] And in the following step S8, the main control section 7 is controlled to carry out skip playback of the video-signal read-out section 2 based on the determined read-out frame number, and reads a required video signal from a record medium 1 intermittently. This step S8 is processing which reads a discontinuous image one by one.

[0035] Furthermore, in the following step S9, the main control section 7 controls the video-signal regeneration section 3 so that only the number of the above-mentioned numbers of display frames carries out the repeat output of the image in which reading appearance was carried out by this read-out processing.

[0036] It will be in the condition of going into the mode of operation to which high-speed playback of a video signal is performed, returning to step S2 after that, and standing by the next actuation input with the playback scale factor chosen by the remote controller 5 in the video-signal regenerative apparatus 10 by this the control of a series of.

[0037] Hereafter, the concrete control method is explained to the pan in high-speed regeneration of this video-signal regenerative apparatus 10. The main control section 7 determines the output method of a video signal in the above-mentioned step S6 by choosing the frame number which reads a video signal to per fixed time amount according to a reproductive scale factor.

[0038] Drawing 3 shows the example in the case of performing 10X playback, and explains the case where high-speed playback of the 1200-frame video signal for 40 seconds shown in drawing 3 (A) is hereafter carried out in 120-frame 4 seconds. In addition, about this high-speed playback, for convenience, although only three kinds of patterns are shown in drawing 3 (B) thru/or (G), this invention is not the thing of explanation limited to three kinds of this pattern. Moreover, only in 10X playback, it explains about this high-speed playback, but as for this invention, it is needless to say that lessons is taken from high-speed playback, and it is not limited to these 10X, and can apply also in 10X or less or high-speed playback of 10X or more.

[0039] In this video-signal regenerative apparatus 10, the read-out gap (read-out frame number) of three patterns, A, B, and C, can be chosen now at the time of 10X playback. In the case of A pattern, a read-out gap is every 150 frames, and the read-out frame number around for 40 seconds has become 8. specifically, it is shown in drawing 3

(B) — as — the video signal for 1200 frames to a 150-frame gap — the video signals A1, B1, C1, and D1 for a total of eight frames, and ... H1 is read. And by A pattern, the number of display frames is 15, and as shown in drawing 3 (E), 8x15=120 frame is constituted in 4 seconds by outputting continuously each [these] video signal A1 by which reading appearance was carried out thru/or H1 every 15 times (15 frames), respectively.

[0040] Moreover, in the case of B pattern, a read-out gap is every 300 frames, and the read-out frame number around for 40 seconds has become 4. As shown in drawing 3 (C), specifically, the video signals A1, C1, E1, and G1 for a total of four frames are read from the video signal for 1200 frames at intervals of 300 frames. And by B pattern, the number of display frames is 30, and as shown in drawing 3 (F), 4x30=120 frame is constituted in 4 seconds by outputting continuously each [these] video signals A1, C1, E1, and G1 by which reading appearance was carried out every 30 times (30 frames), respectively.

[0041] Furthermore, in the case of C pattern, a read-out gap is every 600 frames, and the read-out frame number around for 40 seconds has become 2. As shown in drawing 3 (D), specifically, the video signals A1 and E1 for a total of two frames are read from the video signal for 1200 frames at intervals of 600 frames. And by C pattern, the number of display frames is 60, and as shown in drawing 3 (F), 2x60=120 frame is constituted in 4 seconds by outputting continuously each [these] video signals A1 and E1 by which reading appearance was carried out every 60 times (60 frames), respectively.

[0042] In the video-signal regenerative apparatus 10, when reproduction speed is 10X in this way, either of three patterns mentioned above in the above-mentioned step S6 by the main control section 7 is chosen. And the methods of this selection differ in the fixed mode and adjustable mode which are explained below. In the video-signal regenerative apparatus 10, it is chosen through the actuation input-process section 6 by the control input signal from a remote controller 5 about which shall perform high-speed playback between fixed mode and adjustable mode.

[0043] Here, fixed mode means the mode in which fix to one of patterns and high-speed regeneration is performed. For example, only the above-mentioned A patterns are condition, such as B pattern or C pattern, and are chosen about whether which pattern performs high-speed regeneration by the control input signal from a remote controller 5. Therefore, it is also possible to change the pattern of a display during high-speed playback into arbitration in this fixed mode, when a user operates a remote controller 5.

[0044] In addition, in this fixed mode, in order not to make additional information reflect, processing of the above-mentioned step S5 and step S7 grade becomes unnecessary. But what is necessary is just to determine whether to put high-speed playback into operation with which pattern of Above A and C according to this genre at step S7, when above-mentioned genre information is reproduced by performing control in which additional information was made to reflect also in this fixed mode at step S5 possible. Thereby, in the video-signal regenerative apparatus 10, high-speed playback starts in the optimal setting out according to a genre, and it becomes possible to switch a pattern to arbitration by actuation of a remote controller 5 according to a user's moving state eyesight etc. after that.

[0045] On the other hand, without fixing high-speed regeneration to one of patterns, adjustable mode switches a pattern at any time according to additional information, and means the mode in which it dies (shifting). With the gestalt of this operation, it is supposed that basic setting out at the time of being 10 times the playback scale factor of this is used as B pattern in the above-mentioned step S6, and sequential change of the pattern will be carried out according to additional information at the following step S7. That is, according to the content of additional information, such as the amount of motions, the configuration of a display frame is changed at any time by shifting to A pattern from B pattern at step S7, for example, when the amount of motions is large, moving to reverse, and shifting to C pattern, when an amount is small.

[0046] Hereafter, an example is given and explained about the control method of the main control section 7 in this adjustable mode. When the additional information supplied from the additional information regeneration section 8 is the amount of motions of the above-mentioned image characteristic quantity, in order that an image with many motions may more generally grasp the content, it will be necessary to make [many] a read-out frame number. Therefore, the main control section 7 is controlled to shift to C pattern that it shifts to A pattern that a read-out frame number should be made [many] in the above-mentioned step S7 when the value of the amount of motions is large, and a read-out frame number should be made few when the value of the amount of motions is small on the other hand.

[0047] Therefore, in this adjustable mode, the ease of retrieval is realizable by mainly being reproduced by A pattern, for example about an image like a sports program with many motions, and reproducing an image with comparatively high functionality continuously. The feeling of fatigue at the time of retrieval decreases by mainly being reproduced by C pattern about an image like a weather report without an almost [on the other hand] motion, and the same image's covering 60 frames (for 2 seconds), and reproducing it.

[0048] Moreover, when the additional information supplied from the additional information regeneration section 8 is the scene change information of the above-mentioned image characteristic quantity, in order that an image with many scene changes may more generally grasp the content, it will be necessary to make [many] a read-out frame number. Therefore, the main control section 7 is controlled to shift to A pattern that a read-out frame number should be made [many] in the above-mentioned step S7, when scene change information is supplied.

[0049] Therefore, in adjustable mode, the ease of retrieval is attained by mainly being reproduced by A pattern, for example about an image like an action film with many scene changes, and reproducing the image before and after a scene change. On the other hand, for example about an image like a love film with few scene changes, it will mainly

be reproduced by C pattern, and the feeling of fatigue at the time of retrieval decreases like ****.
[0050] Furthermore, when the additional information supplied from the additional information regeneration section 8 is identification information, such as the content of the above-mentioned program, a genre, existence of alphabetic information, and musical existence, the main control section 7 controls a read-out frame as follows by referring to those information.
[0051] For example, generally a news program has few motions as compared with an above-mentioned sports program etc., and there are many scenes in which alphabetic information is inserted. Therefore, when the identification information of the purport whose content of a program is a news program is inputted into the main control section 7 through the additional information regeneration section 8, it controls by the video-signal regenerative apparatus 10 to begin high-speed playback by C pattern that this main control section 7 should make the number of read-out frames few in the above-mentioned step S7. While the feeling of fatigue at the time of retrieval decreases by this by the same image's covering 60 frames (for 2 seconds), and reproducing it in high-speed playback of a news program, since a static image continues for 2 seconds, effects, like it becomes possible to read alphabetic information clearly arise.
[0052] Furthermore, in this adjustable mode, the main control section 7 controls by making this identification information reflect in the amount of motions of the above-mentioned image characteristic quantity etc. For example, even if it is the same amount of motions, the motion scene of a sports program has that it is [much] more important than the motion scene of a news program, for example. Therefore, the main control section 7 is controlled to make [many] relatively the read-out frame number to the amount of motions, when the identification information which shows that a video signal is a sports program is inputted.
[0053] In the adjustable mode explained above, it differs in the number of display frames mutually by A pattern, B pattern, and C pattern, and the playback scale factor is set constant by making a product with a read-out frame number equal to mutual.
[0054] On the other hand, it has come to be also able to perform changing and displaying a playback scale factor according to the content of additional information at the time of high-speed playback (henceforth adjustable scale-factor mode) further in this video-signal regenerative apparatus 10. In this adjustable scale-factor mode, it becomes possible by setting up that minimum value, making a read-out gap adjustable, and setting the number of display frames as the fixed value by one side to gather a playback scale factor about the range of a video signal for example, with the small amount of motions, and to aim at compaction of the retrieval time as the whole. In this case, the minimum scale factor at the time of high-speed playback will be determined by defining the minimum value of a read-out gap.
[0055] This adjustable scale-factor mode is easily realizable by modification of only setting up equally to mutual the number of display frames of A pattern, B pattern, and C pattern from the condition in for example, the above-mentioned adjustable mode.
[0056] Hereafter, with reference to drawing 4 , it explains per example of setting out in this adjustable scale-factor mode. In addition, in this example, the number of display frames is set as the 15 [same] as the above-mentioned A pattern, and the minimum value of a read-out gap is set to the 150 [same] as the above-mentioned A pattern so that the minimum scale factor at the time of high-speed playback may become 10X.
[0057] In addition, as shown in drawing 4 (A), the case where high-speed playback of the video signal for 2400 frame (80 seconds) is carried out in adjustable scale-factor mode is explained here. Moreover, in order to make an understanding easy, to drawing 4 (B) and (D), a case with a fixed playback scale factor [by A pattern shown in drawing 3 (B) and (E), respectively] of 10X is re-**(ed), and an example at the time of carrying out high-speed playback in adjustable scale-factor mode is shown in drawing 4 (C) and (E).
[0058] Although the control method of the main control section 7 when the additional information supplied from the additional information regeneration section 8 is the amount of motions of the above-mentioned image characteristic quantity is explained hereafter, when the supplied additional information is the scene change information of the image characteristic quantity, and it is identification information, such as the content of the program, a genre, existence of alphabetic information, and musical existence, the same control can realize.
[0059] In this adjustable scale-factor mode, when the additional information which shows that the amount of motions is large is inputted as shown in the drawing 4 (C) left-hand side for example, it will be in the condition of A pattern shown in drawing 3 (B), and reading appearance of the video signals A1, B1, C1, D1, and E1 is carried out by the video-signal read-out section 2 at intervals of 150 frames like the case of 10X immobilization of drawing 4 (B). And in this condition, playback will be made by 10X which is the minimum scale factor as shown in drawing 4 (E).
[0060] Moreover, in adjustable scale-factor mode, when the additional information which shows that the amount of motions is whenever [middle] is detected so that it may be shown in the center of abbreviation of drawing 4 (C), read-out of a video signal will be in the condition of B pattern shown in drawing 3 (C), at intervals of 300 frames, reading appearance of the video signals G1, F1, and I1 is carried out, and reading appearance of the video signals F1 and H1 is not carried out. Consequently, since playback number of sheets (frame number) is set as 15 sheets, about the image outputted, it becomes 20X so that it may be shown in the center of abbreviation of drawing 4 (E).
[0061] Furthermore, in adjustable scale-factor mode, as shown in the drawing 4 (C) right-hand side, when the additional information which shows that the amount of motions is small is detected, read-out of a video signal will be in the condition of C pattern shown in drawing 3 (D), at intervals of 600 frames, reading appearance of the video signal M1 is carried out, and reading appearance of the video signals J1, K1, and L1 is not carried out. Therefore, in this case, as shown in the drawing 4 (E) right-hand side, about the image outputted, it becomes 30X.

[0062] If the above processing is summarized, it will mean that the playback time amount which took 8 seconds in 10X immobilization was shortened as a result at 4 seconds, and will end by the same retrieval time as the case where it reproduces by 20X. And since the gap read about a portion with the large amount of motions of a video signal in this case is narrowed and the gap which moves to reverse and is read about a portion with a small amount is made large, the high image of functionality will be reproduced mutually. therefore, in comparison with the case of 20 simpleX which set constant the gap which reads a video signal, the ease of retrieval is markedly alike and improves.
[0063] The gestalt of operation of the 2nd of this invention is shown in drawing 5 . In the gestalt of operation of the 2nd of this invention, video-signal regenerative-apparatus 10A is equipped with the video-signal read-out section 2, the intermittent signal-processing section 11, memory 12, the output signal processing section 4, the actuation input-process section 6, main control section 7A, the additional information regeneration section 8, and the additional information detection processing section 13.
[0064] This video-signal regenerative-apparatus 10A operates like the video-signal regenerative apparatus 10 mentioned above based on the actuation input from a remote controller 5. In addition, about the portion which attached the same sign as the video-signal regenerative apparatus 10 mentioned above, a configuration is the same as the video-signal regenerative apparatus 10, and the detailed explanation is omitted.
[0065] In case this video-signal regenerative-apparatus 10A is equipped with the same function as the video-signal regenerative apparatus 10 and carries out intermittent read-out of the video signal from a record medium 1 by the video-signal read-out section 2 at the time of high-speed playback, it enables it to output a video signal more nearly promptly by detecting additional information by the additional information detection processing section 13. That is, the additional information detection processing section 13 detects the above-mentioned additional information supplied at the time of intermittent read-out of the video signal by the video-signal read-out section 2. The additional information detected by the additional information detection processing section 13 is used for the control at the time of high-speed playback by being inputted into main control section 7A.
[0066] The intermittent signal-processing section 11 performs processing which reproduces the video signal by which reading appearance was carried out in the video-signal read-out section 2 like the video-signal regeneration section 3 in the above-mentioned video-signal regenerative apparatus 10. And if required, when analog-to-digital-conversion processing is carried out and picture compression processing of MPEG etc. is performed, the extension processing is performed. The intermittent signal-processing section 11 supplies the video signal which performed such regeneration to the output signal processing section 4 as it is at the time of the usual playback.
[0067] On the other hand, the intermittent signal-processing section 11 is beginning to read the video signal which once wrote the video signal which performed such regeneration in memory 12 at the time of high-speed playback, and was written in this memory 12 based on the control from main control section 7A by one frame, and supplies it to the output signal processing section 4 repeatedly the number of predetermined times.
[0068] That is, in this video-signal regenerative-apparatus 10A, the additional information detection processing section 13 detects the additional information included in the video signal intermittently reproduced by the video-signal read-out section 2 at the time of high-speed playback, and image characteristic quantity, such as the detected amount of motions, is supplied to main control section 7A. And in case the intermittent signal-processing section 11 reads the video signal written in memory 12 based on the control signal from main control section 7A, it performs infanticide processing in which the image characteristic quantity was made to reflect.
[0069] The control in this case reproduces the refreshable maximum frame number (namely, the minimum gap) for a certain scale factor, thins it out according to image characteristic quantity, and is made to carry out adjustable [of the amount]. In this video-signal regenerative-apparatus 10A, the video signal is always read from the record medium 1 with A pattern mentioned above by drawing 3 (B) by the video-signal read-out section 2, and the video signal by which intermittent playback was carried out in the intermittent signal-processing section 11 is written in memory 12. And the intermittent signal-processing section 11 carries out infanticide processing so that it may usually become B pattern, and it should just switch it to A pattern or C pattern according to the additional information detected by the additional information detection processing section 13.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the block circuit diagram which applied this invention and in which showing the configuration of the video-signal regenerative apparatus as a gestalt of the 1st operation.
[Drawing 2] It is the flow chart which shows the control action of the main control section of a video-signal regenerative apparatus.
[Drawing 3] It is drawing for explaining high-speed regeneration of this equipment.
[Drawing 4] It is drawing for explaining high-speed regeneration of this equipment.
[Drawing 5] It is the block circuit diagram which applied this invention and in which showing the configuration of the video-signal regenerative apparatus as a gestalt of the 2nd operation.
[Description of Notations]
10 10A A video-signal regenerative apparatus, 1 A record medium, 2 The video-signal read-out section, 3 video-signal regeneration section, 4 The output signal processing section, 6 Actuation input-process section, 7, and 7A main control section, 8 The additional information regeneration section, 11 The intermittent signal-processing section, 12 Memory, 13 Additional information detection processing section

---

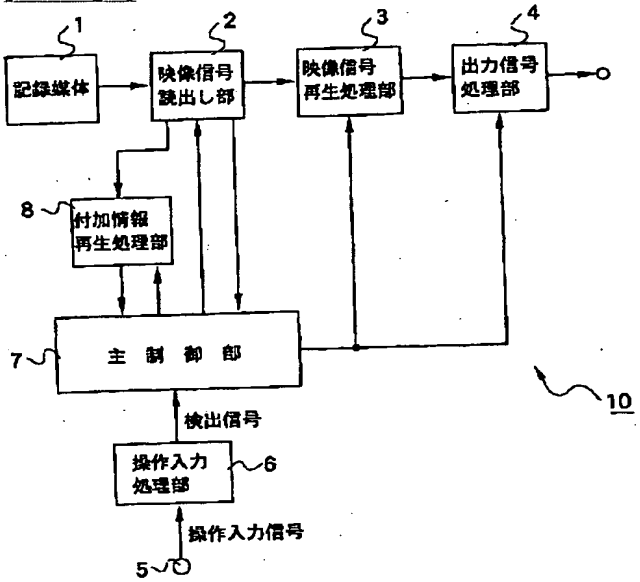
[Translation done.]

* NOTICES *

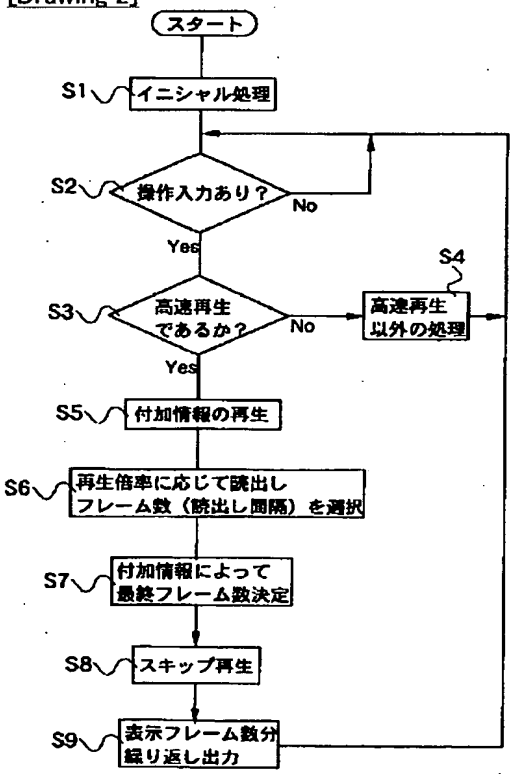
1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

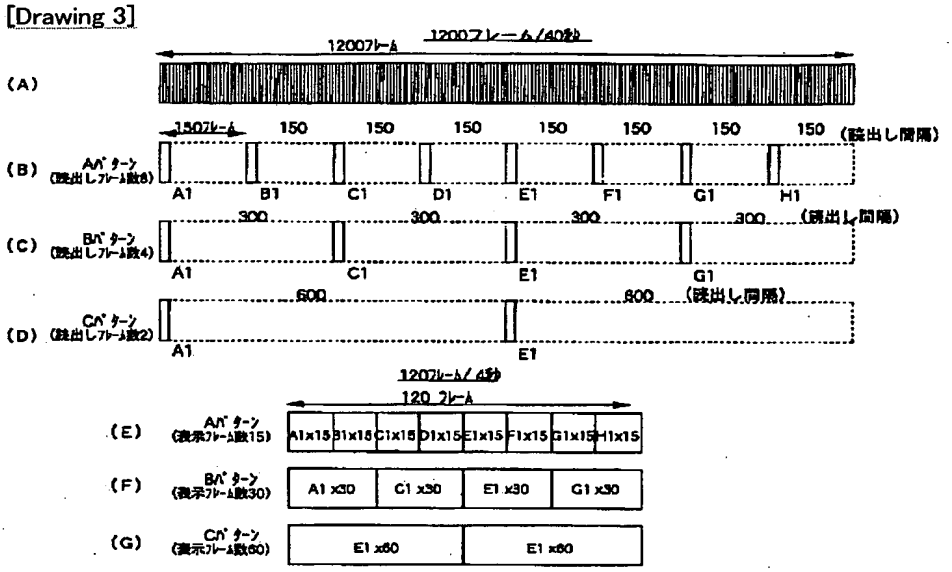
[Drawing 1]



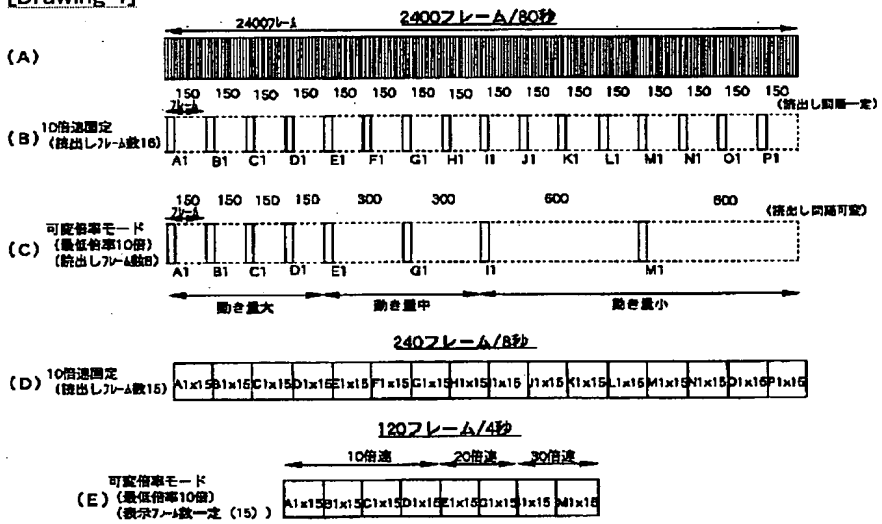
[Drawing 2]



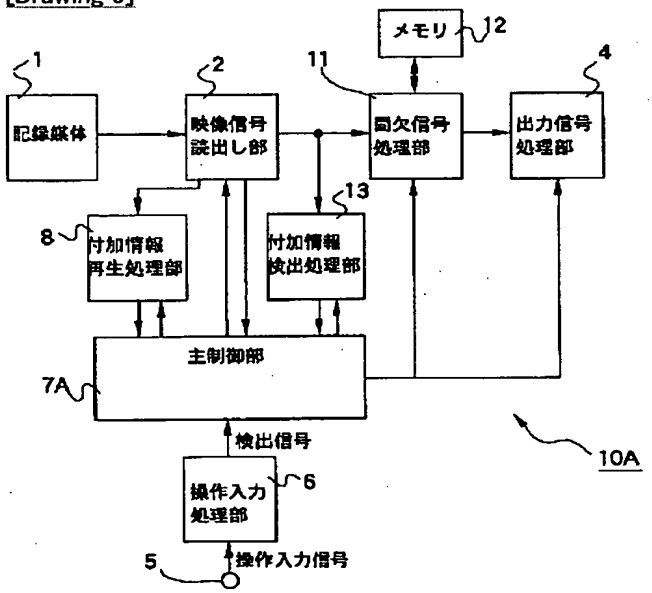
[Drawing 3]



[Drawing 4]



[Drawing 5]



[Translation done.]